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Fig. 4. Shows a single joint of a tooth; *a* is the deposit laid down on the dorsal wall of the cell, and *b* shows the deposit made on the inside.

Fig. 5. Shows the deposit laid down on both sides of one of the bottom (or top) walls of these cells at *b*, and of the external deposit at *a*.

The inner wall of the peristomial layer becomes thickened on either side of the keel line forming the segments of the inner peristome, while the intermediate cell walls of the other cells just inside the peristomial layer forms the cilia.

The number of these cells adjoining each cell of the peristomial layer is somewhat variable, consequently, as is well known, the number of cilia between the segments often varies in the capsule (See also Fig. 15, Plate 1). Sometimes not only the vertical cell wall becomes thickened but the transverse junction also, when the cilia become appendiculate. The separation of teeth and segments, as well as the separation of tooth from tooth and segment from cilium, is brought about by the absorption or breaking down of the connecting portions of the cell walls. In some degenerate peristomes as in the case of *Pylaisia intricata*, *P. velutina* and \**Burnettia* (*Homalothecium*) *subcapillatum* the walls connecting inner and outer peristomes remain, so that the two never become separate.

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\*Named in honor of the late D. A. Burnett.

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## THE MOSSES OF ALASKA.

By J. CARDOT and I. THERIOT

From "Papers from the Harriman Alaska Expedition."

(CONTINUED.)

ENTHOSTHODON SPATHULIFOLIUS Card. and Thér.

Polygamous, rather densely caespitose, green above, brown within. Stem erect, 10–15 mm. high, radiculose, branching with slender clavate branches, starting beneath the parichætium. Leaves soft erect-appressed when dry, sometimes subcrispate, spreading when moist, the lower minute, ovate, the upper larger, 1.5–2 mm. long, 1 broad, oblong-spathulate, entire, obtuse or subapiculate, margins plane, sometimes subrevolute towards the base; costa thin, attenuate, vanishing not far from the apex; areolation lax, basal cells subrectangular, 60–80 by 30 $\mu$ , median and upper shorter, rectangular, quadrate or subhexagonal, 25–30 $\mu$  long, 20 broad, the marginal cells often longer and narrower. Flowers polygamous, terminal, sometimes unisexual, sometimes synoicous; antheridial buds growing at the tip of the branches. Capsule on a pale yellow flexuous seta 6–9 mm. long, obliquely erect, pyriform with a distinct attenuate neck; operculum convex mammillate. Calyptra short-cucullate, not at all or scarcely inflated. Other characters unknown.

From St. Paul Island (Trelease, 2067, 2074).

A remarkable species, very distinct from all the *Enthostodon* of Europe and North America by its polygamous inflorescence, its leaves shortly spatu-

late, obtuse or subapiculate and its calyptra hardly swelling. It is much to be regretted that the too immature capsules do not show the peristome annulus and spores.

*WEBERA PSEUDOGRAECILIS* Card. and Thér.

Dioicous, laxly caespitose, yellowish-green. Stem short, 4-5 mm. high, simple or sparingly branched. Leaves uniformly crowded, small, imbricate when dry, erect-spreading when moist, 1-1.5 mm. long, 0.4-0.6 broad, neither carinate nor decurrent, the lower ones shorter, ovate or ovate-lanceolate, the upper linear-lanceolate, acute, denticulate at apex, the margin slightly reflexed about two-thirds the way from the base; costa rather strong,  $56\mu$  thick at the base, percurrent or subpercurrent, reddish; areolation dense, lower cells rectangular, reddish, the median cells linear  $48-64\mu$  long, 8 broad, the upper narrowly linear with sinuous strongly incrassate walls, the marginal cells narrower and longer. Perichaetial leaves smaller than the stem leaves. Capsule pendulous, pale, obovate, 3 mm. long on a flexuous seta about 2 cm. long with convex mammillate operculum. Antheridial buds terminal, subdisoid. Other characters unknown.

From Muir Glacier (Trelease, 2419, 2425, 2427, 2428, 2463).

Aspect of *Webera gracilis* De Not., but the areolation is different and much closer; it is distinguished, on the other hand, from *Webera Drummondii* Lesq. and James, by its leaves which are more crowded on the whole stem, and not carinate-concave, and its capsule hanging and with a mammillary lid.

*BRYUM ATELEOSTOMUM* Philibert

Polygamous, green, densely caespitose and densely radiculose. Stem branching 1-1.5 cm. high. Leaves erect imbricate, crowded into a comal tuft on stem and branches, 1.2-1.4 mm. long, 0.5 broad, ovate-lanceolate cuspidate by the excurrent costa, all decurrent at base; leaf border entire, sometimes plane, sometimes revolute for a little way; costa thin,  $50-55\mu$  thick at base; areolation rather dense, lower cells quadrate or rectangular,  $25-50\mu$  long, 20-25 broad, some oblong or ovate-hexagonal  $28-45\mu$  long, 12-13 broad; capsule nodding or pendulous, ovate, 2 mm. long, with a short neck, on a rather short, red seta about 1.5 cm. long; operculum convex mammillate. Teeth of the exostome pale yellow, of uniform color, the articulations 20, regular, the endostome barely developed, often composed of a uniform thin fugacious membrane. Spores  $18-20\mu$ .

From Kudak Bay (Coville and Kearney, 1516).

*BRYUM CYLINDRICO-ARCUATUM* Philibert

Monoicous (fide Philibert), green, rather densely caespitose, densely radiculose. Stem erect 1-2 cm. high, with slender branches above. Leaves at base of stem and branches minute, remote, the upper larger, crowded into a head about 2 mm. long, 1-2 broad, erect, subflexuous when dry, spreading or slightly so when moist, ovate or oblong-lanceolate, from a slightly decurrent base, broadly and shortly acuminate, mucronate, margins entire, not at all bordered, scarcely revolute; costa  $80\mu$  thick at base, attenuate above, shortly excurrent, areolation rather dense, lower cells more laxly rectangular,  $55-85\mu$

long, 22 broad, median cells oblong-hexagonal  $28-56\mu$  long, 14 broad, the upper cells smaller and shorter. Antheridial buds terminal 25-30 antheridia. Capsule nodding or pendant, narrowly cylindrical-arcuate, with a long neck on a flexuous red seta 2 cm. long curved at apex; operculum obtusely conical. Teeth of peristome very long, with a red base. Endostome well developed, cilia appendiculate. Spores smooth,  $12\mu$ .

From Kodiak (Trelease, 2186).

BRYUM LAURENTIANUM Card. and Thér.

Plants tall, densely caespitose, yellowish green. Stems 3-4 cm. high radiculose, sparingly foliate with numerous erect subclavate branches. Leaves erect imbricate both dry and moist, ovate or oblong-lanceolate 1-5 mm. long, 0.75 broad, sharply acuminate, margins plane and entire below, distinctly denticulate above, costa stout, becoming brownish,  $80-100\mu$  thick, gradually attenuate and vanishing below the apex, basal cells rectangular, median and upper rectangular or oblong-subhexagonal  $40-75\mu$  long, 14-17 broad, four or five rows of marginal cells longer and narrower, linear, with walls a little thicker forming a scarcely distinct border. Other characters unknown.

From St. Lawrence Island (Trelease, 1871).

This species, which seems to belong to the group of *B. alpinum* Huds. is chiefly characterized by its more acuminate and distinctly denticulate leaves, and by its nerve disappearing below the apex.

BRYUM LEPTODICTYON Philibert

Dioicous, gregarious, pale or yellowish-green. Stem erect, simple 4-6 mm. high. Leaves imbricated when dry, erect when moist, the lower smaller becoming larger above, narrowly lanceolate, sublinear, gradually long-acuminate, 1-1.8 mm. long, 35 broad, not decurrent at base, margin plane, entire below, minutely denticulate above; costa narrow,  $55\mu$  broad at base, percurrent, areolation same as in *Webera*, with uniform linear cells, median  $45-60\mu$  long, 5-6 broad. Capsule abruptly pendulous, oblong, small, 2 mm. long, 0.8-0.9 broad, pale tapering into a short neck on a flexuous reddish seta 1.5-2 cm. long. Operculum conical, apiculate. Peristome perfect, teeth red at base, cilia appendiculate. Spores smooth,  $9-12\mu$ .

From Hidden Glacier in Russell Fiord (Coville and Kearney, 964).

Species very distinct, having quite the facies and areolation of a *Webera* with the peristome of *Bryum*.

BRYUM HETEROGYNUM Philibert

Dioicous. In low tufts, deep dark red, purple when old, covered with earth at base. Stem erect, radiculose, branching, 5-12 mm. high, leaves erect when dry, erect-spreading when moist, ovate-lanceolate, 1.5 mm. long, 0.5-0.6 broad, long-acuminate, cuspidate by the excurrent costa, slightly and acutely denticulate at apex, the margin often bordered, border narrow below plane, broader and distinct above, sometimes subreflexed, rarely wanting; costa narrow,  $50-55\mu$  at base, gradually attenuate, lower cells rectangular  $50-65\mu$  long, 17-22 broad, median cells oblong-hexagonal,  $45-55\mu$  long, 13 broad, the marginal narrower, linear. Capsule nodding or pendulous, ovate-pyriform,

3-4 mm. long, furnished with a tapering neck, on a red seta 2.5-3 mm. long. Operculum convex, teeth of exostome, pale ferrugineous, endostome perfect, cilia appendiculate. Male plants short, gemmiforme, forming distinct tufts with shortly ovate-cuspidate leaves.

From Muir Glacier (Trelease, 2426, 2434, 2441, 2461, 2462). Hidden Glacier Inlet in Yakutat Bay (Trelease, 2518).

*BRYUM PSEUDOSTIRTONI* Philibert

Often synoicous, densely caespitose, dirty or yellowish green. Stems elongated, filiform, slightly branched, 2.5-4 cm. high. Leaves soft, rather lax, erect-imbricate when dry, erect-spreading when moist, the stem leaves ovate-lanceolate, acuminate and cuspidate by the long excurrent costa, 2 mm. long, .7 broad, margins entire, plane or subreflexed. Costa narrow, 60-70 $\mu$  broad at base, areolation lax, lower cells rectangular, median and upper ovate-hexagonal, 28-50 $\mu$  long, 14-17 broad, marginal cells narrower, branch leaves smaller, the lower ovate, subobtusate or shortly cuspidate. Capsule nodding or pendulous, oblong, small 2 mm. long, tapering into a short neck, subconstricted or not constricted when dry, on a slender seta 1.5 cm. long. Operculum conical-mammillate, teeth of exostome pale red at base, endostome perfect, with cilia sometimes long-appendiculate and sometimes simple. Spores 12-18 $\mu$ .

From Muir Glacier (Trelease, 2448, 2459).

*BRYUM HARRIMANI* Card. and Thér.

Quite robust, rather densely caespitose, yellowish-green. Stems erect, 3-4 cm. high, fragile, radiculose, loosely foliate, branching, with erect obtuse branches. Leaves soft, erect-spreading when dry and somewhat spreading when moist, 1.2-1.6 mm. long, .8-.9 broad, slightly decurrent at base, plane or subreflexed margins, dimorphous, the lower ovate-lanceolate, acute, the upper and branch leaves broadly-ovate, strongly concave with an obtuse cucullate apex. Costa thin, 40-50 $\mu$  broad at base, percurrent or shortly excurrent in the acute lower leaves, vanishing below the apex in the obtuse upper leaves, areolation very lax, scarcely chlorophyllose, lower cells quadrate or short-rectangular, 40-50 $\mu$  long, 25-35 broad, the others ovate-hexagonal, marginal linear in one or two rows. Other characters unknown.

From Yakutat Bay (Trelease, 1793); Hidden Glacier Inlet (Trelease, 1784 in part, 1815).

This moss can be placed near *B. obtusifolium* Lindb. from which it is easily distinguished by its dimorphous leaves, plane on the borders and of a looser texture.

*BRYUM DUVALII* *OBTUSATUM* Card. and Thér.

Differs from the typical form in the obtuse leaves with cucullate-denticulate apex, a little less decurrent at base.

From Disenchantment Bay (Trelease, 2517).

*BRYUM DREPANOCARPUM* Philibert

As far as observed dioicous, laxly caespitose, fuscous-green or purplish-red. Stems erect, 1-2 cm. high, radiculose below, branching above with numerous slender, erect branches. Leaves erect when dry, flexuous when

moist, erect-spreading, about 2 mm. long, .9 broad, not at all or slightly decurrent at base, oblong-lanceolate, acuminate, acute or cuspidate by the short excurrent costa, margins entire, reflexed, narrowly bordered. Costa thin, attenuate, percurrent in the lower leaves, short-excurrent in upper; areolation slightly chlorophyllose, median cells subrectangular or oblong hexagonal, 47–70 $\mu$  long, 16–22 broad. Capsule nodding or inclined, fuscous when old, oblong, tapering into a long neck, curved, dilated at mouth, on a red seta, 1.5–2 cm. long when mature. Operculum conical. Peristome perfect, teeth of exostome red at base, membrane of endostome broad, cilia appendiculate.

From Juneau (Canby, 485; Coville and Kearney, 579); Disenchantment Bay (Trelease, 2515).

This species, which offers many points of resemblance to *B. maeseoides* Kindb., differs from it by the peristomial teeth which are firmer, stiffer, more scabrous and reddish at the base, the segments more acuminate and perforate from more irregular openings, and the higher membrane.

*MNIUM PUNCTATUM* ANCEPS Card. and Thér.

Differs from the typical form in the leaves which are often cuculate and the much smaller upper cells which are almost isodiametric as in *Mnium glabrescens* but distinguished by not having an incrassate border.

From Unalaska (Trelease, 1727).

*BARTRAMIOPSIS LESCURI* Card. and Thér. not Kindb.

Dioicous, loosely caespitose, dark-green. Stem very slender, filiform, flexuous, simple or forked, loosely foliate. Leafless below for a considerable distance, 2–8 cm. high. Leaves when dry very crispate, when moist arcuate-spreading, 4 mm. long, subsheathing at base, linear-lanceolate acuminate, the basal margins entire below, having 3–5 long cilia above on each side, the margins of the blade plane, strongly serrate, scarcely bordered; costa broad, smooth on back, lamallate on front, 5–8 lamellæ, dentate on margins in cross sections consisting of six to eight rows of cells, cells of the base rectangular, hyaline, four to six times times longer than broad, areolation of blade opaque, cells minute-hexagonal (8 $\mu$  in diam.) bistratose except at margin which is unistratose forming a translucent border. Capsule at first short ovate-cylindrical, when old turbinate, gymnostomous, strongly dilated at mouth, closed by the epiphragm which adheres to the columella. Seta red, short, 8–12 mm. long, operculum high-conical, long-acuminate almost equaling the capsule, calyptra without hairs, smooth, short-acuminate, covering the operculum. Spores ovate or subangular 12–16 $\mu$ .

From Virgin Bay (Trelease, 1733); Orca (Trelease, 1731); Douglas Island (Trelease, 1729, 1730).

The moss which was described by Mr. Kindberg, under the name of *B. Lescurii*, from sterile specimens collected in Japan, does not seem to be the true *Atrichum Lescurii* James, because its leaves are only incurvate and not crispate when dry. On the contrary, it is probable that *B. Sitkana* of Kindberg, equally described from sterile specimens, differs in nothing from the species of James. The latter was, after all, imperfectly known until now,

the author having seen neither the calyptra nor the lid, and having been unable to ascertain the existence or absence of a peristome. Therefore, we here give a complete description with drawings of this interesting moss, which by the absence of the peristome and chiefly by the structure of its leaves, which, except on the borders, consist of two layers of cells, seems to us to constitute a genus distinct from *Atrichum*.

Note 2, p. 347. In a recent paper in "The Journal of Botany," Vol. 39, pp. 339-341, Mr. E. S. Salmon points out that *Bartramiopsis Lescurii* has the same leaf structure as *Lyellia crispa*, and he suggests placing it in this genus. But *Bartramiopsis* differs from *Lyellia* by its small, erect, symmetrical not angular and macrostomate capsule, and it seems preferable to keep it as a distinct genus.

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### OFFERINGS TO CHAPTER MEMBERS.

[To chapter members only—for postage.]

- Mrs. S. B. Hadley, South Canterbury, Conn. *Mnium hornum*, L. cfr. *Thuidium paludosum* (Sulliv.) Rau. & Herv. cfr. A form near the type. *Physcomitrium turbinatum* (Rich.) C. M. cfr. *Aulacomnium palustre* (L.) Schwaegr. cfr. Collected in S. Canterbury.
- Miss Alice L. Crockett, Camden, Maine. (Four cents postage). *Anomodon attenuatus* (Schreb.) Heuben. *Bartramia pomiformis* (L.) Hedw. cfr. *Hylocomium Schreberi* (Willd.) De Not. cfr. *Hylocomium splendens* (Hedw.) B. & S. st. *Sticta crocata* (L.) Ach. Collected in Camden.
- Mrs. J. D. Lowe, Noroton, Conn. *Ceratodon minor* Aust. cfr. *Bryum caespititium* L. cfr. Collected in Noroton.
- Mr. W. C. Barbour, Sayre, Pa. (Four cents postage). *Porella navicularis* (L. & L.) Lindb. Collected in Sayre. *Placodium elegans* (Link) DC. Collected in New Westminster, B. C.
- Miss Harriet Wheeler, Chatham, N. Y. *Antitrichia Californica* Sulliv. cfr. *Racomitrium canescens* (Timm.) Brid. cfr. *Mnium Menziesii* C. M. cfr. Collected by Mr. A. J. Hill, in New Westminster, B. C.
- Mr. J. Warren Huntington, Amesbury, Mass. *Bruchia Sullivantii* Aust. *Tortula papillosa* Wils. *Hypnum Vaucheri* Lesq. Collected in Amesbury.
- Mrs. Carolyn W. Harris, Chilson Lake, Essex Co., N. Y. *Sticta amplissima* (Scop.) Mass. *S. pulmonaria* (L.) Ach.